MRC Unit.

18th December, 1961.

Dear Fritz,

Thank you for your paper. It is nice to know that someone is working on the biochemistry and not merely going for the code. After your letter arrived I received two pre-prints from Ochoa, but do not feel unduely impressed. The papers give the impression of being rather hurried and slip-shod and while our own work confirms part of what he has done, in one or two cases, we find somewhat different results.

I feel sure that the code is degenerate, and it is not easy to explain even the present biochemical data without assuming this, even if Ochoa thinks he can! However, Wittman's data suggest that the code is not <u>randomly</u> degenerate - there is likely to be some connection between the various triplets which stand for one amino acid. After I got your letter I devised a code (with AAA and GGG as spaces, and the other 62 triplets allocated to 20 amino acids) which is degenerate, but for which there is only <u>one</u> kind of soluble RNA for each amino acid! However, I doubt if it is completely correct.

It seems to me that (whether the messenger RNA is used only o once or not) it is very likely that where <u>part</u> of a polypeptide chain has been synthesised it will be attached by a chemical band to the RNA, probably by an extra link between the C terminal end and the of the ribose. Have you been able to show this? It is also of interest to ask what happens at the beginning and the end of the process. In particular, if, say, the poly U has a number of residues which is <u>not</u> a multiple of 3, can the polypeptide be "finished", i.e. can it separate from the messenger?

Unfortunately, we do not yet know which end of the messenger is which. That is, which end of the poly U corresponds to the N terminal end of the polyphenylalanine, though

2/over...

we hope to know this shortly.

I have arranged to give a talk at the Rockefeller on Tuesday, 27th February, but I hope to be in New York a few days before that. I will let you know more definitely when my plans are more certain. It will be great fun to have a proper discussion about all this.

With best wishes,

Yours ever,

F.H. Crick

Dr. Fritz Lipmann,
The Rockefeller Institute,
New York 21,
New York,
U.S.A.